

We claim:

1. A device for cutting a block into slabs, said device comprising a plurality of generally parallel, spaced-apart blades with
each of the blades having a blade length with two ends and a center,
each of the blades having a plurality of cutting segments mounted thereon,
5 the cutting segments being spaced apart from one another by a center-to-center distance,
each of the cutting segments comprising a continuous phase impregnated with a superabrasive material selected from one of natural diamond, synthetic diamond, cubic boron nitride, and combinations thereof; and
10 wherein there is a spacing variation of at least 1 mm between a maximum center-to-center distance and a minimum center-to-center distance of the cutting segments.
2. The device of claim 1, wherein at least one of the cutting segments located
15 at or within 10% of blade length from each end of the blades have a center-to-center spacing that differs by at least 1mm from the center-to-center spacing of at least one of the cutting segments located at or within 10% of blade length from the center of the blades.
- 20 3. The device of claim 2, wherein at least one of the cutting segments located at or within 25% of blade length from each end of the blades have a center-to-center spacing that differs by at least 2 mm from the center-to-center spacing of at least one of the cutting segments located at or within 25% of blade length from the center of the saw blades.
- 25 4. The device of claim 2, wherein at least one of the cutting segments located at or within 25% of blade length from each end of the blades have a center-to-center spacing that differs by at least 5 mm from the center-to-center spacing of at least one of the cutting segments located at or within 25% of blade length from the
30 center of the saw blades.

5. The device of claim 1, wherein at least one of the cutting segments has a wear resistance property that differs by at least 10% from the wear resistance property of at least one of the other cutting segments mounted on the same blade.

5 6. The device of claim 1, wherein at least one of the cutting segments has at least one wear resistance variable that is different from at least one of the other cutting segments mounted on the same blade, wherein the at least one wear resistance variable is selected from the group of:

concentration of the superabrasive materials,
10 grade of the superabrasive materials as measured by compressive fracture strength (CFS) property;
at least one dimension of said segment;
amount of secondary abrasives in said segment;
concentration of secondary abrasives in said segment; and
15 grain size of said superabrasive materials.

7. A device for cutting a block into slabs, said device comprising a plurality of generally parallel, spaced-apart blades,
each of the blades having a plurality of cutting segments mounted thereon,
20 the cutting segments being spaced apart from one another by a center-to-center distance,

each of the cutting segments comprising a continuous phase impregnated with a superabrasive material selected from one of natural diamond, synthetic diamond, cubic boron nitride, and combinations thereof;

25 wherein at least one of the cutting segments has a wear resistance property that differs by at least 10% from the wear resistance property of at least one of the other cutting segments mounted on the same blade.

8. The device of claim 7, wherein at least one cutting segment has at least one
30 wear resistance property variable that is different from at least one of the other cutting segments, said at least one wear resistance variable is selected from the group of:

concentration of the superabrasive materials,
 grade of the superabrasive materials as measured by compressive fracture
 strength (CFS) property;
 at least one dimension of said segment;
 5 amount of secondary abrasives in said segment;
 concentration of secondary abrasives in said segment; and
 grain size of said superabrasive materials.

9. The device of claim 7, wherein at least two of the cutting segments
 10 comprise superabrasive materials with different sizes and grades.

10. The device of claim 7, wherein the cutting segments contain blends of at
 least two components: coarse diamond crystals and fine diamond crystals having
 different compressive fracture strength (CFS) properties, and wherein the coarse
 15 diamond crystals have a CFS of at least about 70 N greater than the fine diamond
 crystals.

11. The device of claim 10, wherein said the CFS property difference between
 the coarse diamond crystals and the fine diamond crystals is between about 70 N
 20 and 100 N.

12. The device of claim 10, wherein the coarse diamond crystals are at least
 about 300 μm larger than the fine diamond crystals.

25 13. The device of claim 10, wherein the size difference between the coarse
 diamond crystals and the fine diamond crystals is between about 300 and 400 μm .

14. A method for cutting a block of granite, concrete, marble, sandstone,
 limestone, fired brick, or composite materials thereof, into slabs, said method
 30 comprises subjecting said block to a cutting device comprising a plurality of
 generally parallel, spaced-apart blades,
 each of the blades having a plurality of cutting segments mounted thereon,

the cutting segments being spaced apart from one another by a center-to-center distance, each of the cutting segments comprising a continuous phase impregnated with a superabrasive material selected from one of natural diamond, synthetic diamond, cubic boron nitride, and combinations thereof;

5 wherein at least one of the cutting segments has a higher wear resistance property than at least one of the other cutting segments mounted on the same blade.

15 15. A method for cutting a block of granite, concrete, marble, sandstone, limestone, fired brick, or composite materials thereof, into slabs, said method comprising subjecting said block to a cutting device comprising a plurality of generally parallel, spaced-apart blades,

 each of the blades having a blade length with two ends and a center,
 each of the blades having a plurality of cutting segments mounted thereon,

15 the cutting segments being spaced apart from one another by a center-to-center spacing distance, each of the cutting segments comprising a continuous phase impregnated with a superabrasive material selected from one of natural diamond, synthetic diamond, cubic boron nitride, and combinations thereof;

 wherein there is a spacing variation of at least 1 mm between a maximum
20 center-to-center distance and a minimum center-to-center distance of the cutting segments.

16. The method of claim 15, wherein at least one of the cutting segments located at or within 10% of blade length from each end of the blades have a
25 center-to-center spacing that differs by at least 2mm from the center-to-center spacing of at least one of the cutting segments located at or within 10% of blade length from the center of the blades.

17. The method of claim 15, wherein at least one of the cutting segments has
30 at least one wear resistance property variable that is different from said at least one of the other cutting segments,

said at least one wear resistance variable is selected from the group of:
concentration of the superabrasive materials, grade of the superabrasive materials
as measured by compressive fracture strength (CFS) property; dimensions of said
segment; amount of secondary abrasives in said segment; concentration of
5 secondary abrasives in said segment; and grain size of said superabrasive
materials.

18. The method of claim 17, wherein the cutting segments contain blends of at
least two components: coarse diamond crystals and fine diamond crystals having
10 different compressive fracture strength (CFS) properties, and wherein the coarse
diamond crystals have a CFS of at least about 70 N greater than the fine diamond
crystals.